

Warm-up

① Simplify, then evaluate

$$(-2)^3 + 2^4 \cdot (-2)^1 = -8 + 16 \cdot (-2) = -8 + (-32) = -40$$

② Simplify to a single exponential

$$\begin{aligned} \text{a) } \frac{(-3)^3 \cdot 3^6 \cdot 5^4}{(-5)^1 \cdot (-3)^4} &= \frac{+3^3 \cdot 3^6 \cdot 5^4}{-5^1 \cdot +3^4} \\ &= + \frac{3^9 \cdot 5^4}{5^1 \cdot 3^4} = \underline{\underline{3^5 \cdot 5^3}} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{5^{4a-3}}{5^{a+1} \times 5^{2a-2}} &= \frac{5^{4a-3}}{5^{3a-1}} = 5^{(4a-3) - (3a-1)} \\ &= 5^{(4a-3) + (-3a+1)} \\ &= \underline{\underline{5^{a-2}}} \end{aligned}$$

HW 1.6

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$$2i) \ominus (-2)^4 = \ominus (+2^4)$$
$$= -2^4$$

(F)

$$4k) (-2)^0 - (-3)^0 = 1 - 1$$
$$= 0 \checkmark$$

7th Mon: Go over 1.7

Quiz 1.6/1.7

Go over 1.4/1.5 Quiz

$$7g) \frac{(-2)^5 \times 2^3 \times (-2)^4}{2 \times (-2)^2 \times 2^2} = \frac{-2^5 \times 2^3 \times 2^4}{2^1 \times 2^2 \times 2^2}$$

$$= - \left(\frac{2^{12}}{2^5} \right)$$

$$= \boxed{-2^7} \checkmark$$

$$4g) (-2 \times 3)^0$$
$$(-6)^0 = 1 \checkmark$$

$$8k) \frac{(-2)^5 \oplus (-2)^2}{(-2)^4} = \frac{-32 + 4}{16}$$

$$= \frac{-28 \div 4}{16 \div 4} = \frac{-7}{4}$$

Write the following in repeated factor form, then as a single exponential. What do you notice?

$$(2^2)^3 = \underbrace{2^2 \times 2^2 \times 2^2}_{3 \text{ times}} = \underbrace{(2 \times 2) \times (2 \times 2) \times (2 \times 2)}_{6 \text{ total}} = \frac{2^6}{2 \times 3}$$

Power of a Power Rule:

$$(a^n)^m = a^{n \cdot m}$$

When we raise an exponential to another power, we Multiply the powers and keep the base the same.

For example, write as a single exponential:

$$(4^5)^4 = 4^{5 \cdot 4} \\ = 4^{20}$$

$$((-2)^4)^{10} = (-2)^{4 \cdot 10} \\ = (-2)^{40} = 2^{40}$$

Write the following in repeated factor form, then as a single exponential. What do you notice?

$$(4 \times 6)^2 = \underbrace{(4 \times 6) \times (4 \times 6)}_{\text{reorder}} = \frac{(4 \times 4) \times (6 \times 6)}{=} = 4^2 \times 6^2$$

Power of a Product Rule:

$$(a \times b)^n = a^n \times b^n$$

When we raise a product (multiplication) to a power, we can take each part of the product and raise it to the same power.

For example, simplify to a product of exponential(s):

$$(8 \times 7)^5 = 8^5 \times 7^5$$

$$(8^3 \times 7^2)^5 = (8^3)^5 \times (7^2)^5 \quad (8 \times 7)^5 =$$

$$= 8^{15} \times 7^{10}$$

$$= 15^5$$

Not product No rule
B E D M A S

Write the following in repeated factor form, then as a single exponential. What do you notice?

$$\left(\frac{7}{8}\right)^3 = \frac{7}{8} \times \frac{7}{8} \times \frac{7}{8} = \frac{7 \times 7 \times 7}{8 \times 8 \times 8} = \frac{7^3}{8^3}$$

$$\left(\frac{a}{b}\right)^n = (a \div b)^n = \frac{a^n}{b^n}$$

Power of a Quotient Rule:

When we raise a ~~product~~ ^{Quotient} (division) to a power, we can take the Numerator as well as the denominator and raise both to the same power.

For example, simplify to a fraction:

$$\left(\frac{5}{12}\right)^3 = \frac{5^3}{12^3}$$

$$\left(\frac{2^3}{3^2}\right)^4 = \frac{(2^3)^4}{(3^2)^4} = \frac{2^{12}}{3^8}$$

All of these are **WRONG!!** Explain why and fix the mistakes!

Product Rule

$$2^3 \times 2^4 = 2^{3+4} = 2^7$$

keep base same

$$5^3 \times 5^4 = 5^{3+4} = 5^7$$

Quotient Rule

$$\frac{3^8}{3^2} = 3^{8-2} = 3^6$$

keep base same

$$\frac{9^6}{9^2} = 9^{6-2} = 9^4$$

$8^0 = 1$

$a^0 = 1$

0^0 is Undefined

no product

$$(6+7)^4 = 6^4 + 7^4 = 13^4$$

$$(3^4)^9 = 3^{36}$$

$$\left(\frac{5}{7}\right)^3 = \frac{5^3}{7^3}$$

power on top and bottom